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RAILROAD AND STREET TRANSPORTATION

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The Pacific type of passenger locomotive. This type of locomotive is used by railroads entering Cleveland. It has driving wheels over seven and one-half feet in diameter, weighs 86 tons on the driving wheels, has a water capacity of 7,500 gallons and a fuel capacity of 12 tons

CLEVELAND EDUCATION SURVEY

RAILROAD AND STREET TRANSPORTATION

BY

RALPH D. FLEMING

THE SURVEY COMMITTEE OF THE
CLEVELAND FOUNDATION
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FOREWORD

This report on "Railroad and Street Transportation" is one of the 25 sections of the report of the Educational Survey of Cleveland conducted by the Survey Committee of the Cleveland Foundation in 1915. Twenty-three of these sections will be published as separate monographs. In addition there will be a larger volume giving a summary of the findings and recommendations relating to the regular work of the public schools, and a second similar volume giving the summary of those sections relating to industrial education. Copies of all these publications may be obtained from the Cleveland Foundation. They may also be obtained from the Division of Education of the Russell Sage Foundation, New York City. A complete list will be found in the back of this volume, together with prices.

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RAILROAD AND STREET TRANSPORTATION

PART I

RAILROAD TRANSPORTATION

Railroad transportation in the United States employs one man among each 16 between the ages of 21 and 45 engaged in gainful occupations, and pays its workers each year a total of $1,400,000,000. To a greater extent than most utilities dealing with public servic it is national rather than local in character. Its problems, its work, and its methods in different localities follow the same general lines. While affected by such diverse elements as topography, industries, traffic density, water transportation, etc., the essentials of railroad transportation in the vicinity of Cleveland differ but little from those in other parts of the country.

The Interstate Commerce Commission has divided the railroad map into three broad territorial divisions, the east, the west, and the south. The eastern section, of which Cleveland forms a part, includes the territory east of the Mississippi and north of the Ohio and Potomac rivers.

In 1910 this section had an estimated population of 37,600,000 persons, and contained one-third of the total railroad mileage of the United States. Within its limits were transported more than two-fifths of the freight and nearly one-half of the passengers carried by railroads in the entire country. In operating revenues, traffic density, and number of employees it ranked first among the three territorial divisions. It contains seven large railroad systems, four of which—the Pennsylvania, New York Central, the Baltimore and Ohio, and the Erie—have termini in Cleveland.

Scope of Study

This report treats only of those railroad occupations that are directly concerned with the actual operation of trains, such as those of engineers, firemen, conductors, and trainmen. These occupations have many points in common and bring into play many similar mental and physical characteristics. The requirements for entrance are strict and examinations for higher positions obligatory. In all of them the hazards are great. Each occupation is firmly intrenched in unionism. When such matters as promotion, hours, wages, and overtime are in dispute, settlement is made by collective bar-

gaining with railroad officials, or in case of disagreement, by arbitration proceedings.

In Table 1 will be found an estimate of the number of men engaged in these occupations in Cleveland at the present time. This estimate is based on the figures of the U. S. Census for 1910. The increase since that date is computed on the basis of the general increase in population for the past five years.

TABLE 1.—ESTIMATED NUMBER OF MEN EMPLOYED IN TRAIN OPERATING IN CLEVELAND, 1915

Occupation	Number
Switchmen and flagmen	1,116
Enginemen	1,051
Brakemen	919
Conductors	788
Firemen	591
Total	4,465

Requirements for Entrance

The requirements for entrance call for a high degree of physical fitness. Some idea of the strictness of the examinations may be gained from the following description.

A prospective fireman is first required to fill out an application. Among other data he must give his family history as it relates to insanity, tuberculosis, and certain other diseases. His examination includes reading and writing, vi-

sion and hearing, tests of color sense by means of flags and lanterns, and finally a physical examination by a physician. The severity of these color discrimination tests is shown by the fact that about four per cent of all applicants fail in them. If a candidate is successful in his examinations, he makes a number of student trips over the road in order to familiarize himself with his duties. Each engineer with whom he rides reports on his fitness to do the work. After entering the service, he is given other examinations at frequent intervals.

Few men in these occupations are now hired under the age of 21 or over that of 35. They usually enter the service in their early twenties. This enables the railroads to obtain the services of men during their most productive period.

The exacting entrance requirements insure a type of employees which, for physical fitness, mental alertness, and ability to handle difficult situations is unsurpassed in any industry.

Promotion in Railroad Service

In all the occupations which have to do with train movement there are certain established rules which govern promotion. Seniority, by which is meant length of service, gives to the oldest engineer, fireman, conductor, or train-

man, the choice of the desirable runs open to his class. This advantage was won by railroad employees through collective bargaining. It has completely freed them from the evils of favoritism in the distribution of runs.

Frequent examinations are the stepping-stones to higher positions. They are compulsory on practically all roads in the eastern section. In this way a fireman qualifies for the position of engineer, a freight conductor for that of passenger conductor, and a brakeman for a position as conductor.

In a recent arbitration with trainmen and conductors it was claimed by the railroads in the eastern group that a brakeman was promoted to a conductor's position after an average service of about six years. In another arbitration it was stated that the fireman's period of apprenticeship before promotion to the position of engineer averaged about seven years. Examinations for promotion are based on a standard text known as the Book of Rules. This is a compendium of information for all employees whose duties are in any way connected with the movement of trains, and includes general rules and regulations; definitions of railroad nomenclature; train rules on standard time, signals movement, orders, and interlocking; and spe-

cific regulations for each occupation in road and yard service.

Each of the two services, passenger and freight, has its advantages. The passenger service is preferred by those trainmen and conductors who desire a short working day with little overtime. Freight service requires a longer working day and more overtime. The younger engineers as a rule prefer fast trains in either service, while the older men are satisfied with local passenger and way freight trains because less strain is involved in their operation.

It is claimed that with the coming of locomotives of greater tractive power, cars of greater capacity, and trains of increased length, there is less demand for enginemen and trainmen in freight service because fewer trains are needed to accommodate the traffic. As a result, many who qualify for these positions are unable to secure them. One fireman on a railroad running out of Cleveland testified in arbitration proceedings that during a period of five and one-half years after passing the engineer's examination he had served in this capacity only about five months. He attributed his inability to hold an engineer's position to the increase in size and relative decrease in number of locomotives and stated that on his road the tractive power of some engines was nearly double that of engines

in service 10 years before. It is a commonplace of modern industrial experience that the introduction of improved machinery is likely to displace employees.

Another fireman, at the same arbitration, testified that he began his duties as fireman in 1889, and had been promoted to the ranking of engineer in 1902, but on account of the seniority rule had never been able to secure a regular run. The railroad industry is not peculiar in having more men than positions or in requiring preliminary service before a regular position is secured. In street car transportation and in certain kinds of public service a long period as an "extra" is often required. It is probable that in railroad work this period is longer than in other industries.

Steadiness of Employment

Freight tonnage, like steel production, is a barometer of business. The freight department is the first to feel the effects of dull times. The amount of tonnage hauled by slow freight trains is to the railroad man a true index of business conditions. In periods of depression the passenger and fast freight services suffer least, but even these may be reduced in times of extreme stringency.

The seasons, too, have some effect on railroad transportation. At lake ports, like Cleveland, the coming of winter means the close of navigation, and freight which otherwise would be transported by water is turned over to the railroads. In general throughout this section, the winter months, especially December and January, bring the heaviest operating revenue, while June, July, and August bring the lightest.

The effect of business depression on railroad employees is usually tempered as far as possible by written agreements or understandings between employees and officials, to reduce crews only as business declines and distribute all work as equitably as possible. In a railroad running out of Cleveland the following rule prevails with regard to engineers: "Engineers in through freight service shall be allowed to make a minimum of 3,000 miles per month. When business falls off men shall be reduced, beginning with the youngest engineer (in point of service) in this class, the company to be notified by the engineer's committee when this is necessary."

On another railroad with a Cleveland terminus, engineers who have been reduced to positions as firemen on account of reduction of business have the privilege of "bidding in," or requesting the best runs. In a majority of cases, passenger runs, which are considered more

desirable, are taken by the reduced engineer, and this results in sending the fireman further down the line. In some cases firemen in freight service go back to the extra list, and the extra men in turn are furloughed.

Depression may result in forcing the conductor to drop back and become a flagman, the flagman a brakeman, the regular brakeman an extra brakeman, and the extra man to be furloughed. In some cases, however, in freight service, the men voluntarily take a reduction of earnings in times of depression in order that all may share in the work.

Methods of Discipline

The safe carriage of passengers and goods calls not only for the perfect operation of mechanical equipment, but also for a highly efficient working organization. This necessitates rigid compliance with rules on the part of engine and train crews; in fact the work of a railroad is carried on with almost military strictness. Violation of the rules on the part of an employee may result in reprimand, suspension, or dismissal, according to the gravity of the offense. The penalty of suspension has practically superseded the others except in extreme cases, such as drunkenness, theft, or

other gross violation of the rules, in which cases the offenders are summarily dismissed.

Probably the most common form of offense that entails suspension is to run past a block signal which, when set against a train, requires it to come to a full stop. The penalty imposed for committing this offense is from 30 to 42 days suspension for the engineer and from 10 days to two weeks for the fireman. If the conductor happens to be riding in the cab at the time, he is held equally culpable with the engineer. If the employee thinks an injustice is being done him he is usually allowed to have some one present his case. A local officer of the railroad brotherhood usually defends him, and in case of an adverse decision an appeal may be taken through various railroad officials until a final decision is secured from the general manager.

On some railroads the method of discipline used is a modification of what is known as the Brown system, whereby demerits take the place of suspension. The offenses are graded and when an employee has received a certain number of demerits he is dismissed from the service.

Duties of the Service

Train movement, broadly divided, falls into two classes—passenger and freight—with the same

The Mallet—Two locomotives in one. This is the largest kind of freight engine in use. It has driving wheels almost six feet in diameter, weighs almost 240 tons on the driving wheels, has a water capacity of 12,000 gallons and a fuel capacity of 16 tons

number of men on each engine and train crew. The duties of the engine crew are similar for both services, but those of the train crew differ widely.

The work of the engineer is well described in the testimony of an Empire State Express engineer who appeared as a witness in a recent wage arbitration between the railroads and the Brotherhood of Locomotive Engineers.

"I arrive at the engine house at about 1:15 A. M., an hour after I am called, register, examine the bulletin board, get a time-slip signed, and examine the work report book. If the engine was brought in by another man, I see what work was reported on it, then find the engine, see if the work has been done, and give it a general inspection. . . . After my inspection a hostler takes the engine out of the roundhouse, gets coal and water, and takes the engine down to the depot. I ride down and take charge of her after she gets there. I compare my watch with the standard clock in the depot, oil around, and when the train comes in, and the other engine cuts off, I back on to the train. I try the brakes, put on the steam heat. . . . compare my watch with the conductor's, take train orders and messages from him, if there are any, and we are ready for the start."

The engineer then recounts how he has to run

148 miles in 162 minutes at varying speeds from eight miles an hour within the city limits, to 45 in the open country, with occasional spurts at 70 to 75 to make up time lost on slow-downs. Besides actual operation of the engine, the engineer on this run has to watch for 151 stop signals, an average of almost one signal per mile, or nearly one per minute.

His duties after arrival at the terminal are described as follows: "After the engine is cut off the train, I take it to the engine house and leave it on the ash-pit track, give it a general inspection, report the work verbally to a work report clerk, and then sign for the report; make out a time-slip; make out a detention report to the master mechanic and superintendent, and a telegraph report to the master mechanic whether there are detentions or not. . . . Also make out a report to the chief signal man of signal failure, where there are any, where we stop or slow down by a signal and don't know the cause."

The duties of the fireman are quite as exacting in their way as those of the engineer. He reports at the round house about an hour before leaving time, informs the head coaler of his arrival, deposits his extra clothing on the engine, and draws a supply of tools, flags, lights, etc. He then gets on the engine, ascertains the amount of water in the boiler, and looks after his fire.

Although the fire has been built for him in the round house, he must spread it and otherwise get it into shape.

The fireman, in addition to his usual duty of firing, must also observe and call crossing and other signals to the engineer. If the engine is equipped with an automatic stoker, he must see that the stoker feeds the coal evenly on the fire, break up lumps of coal too large for it to handle, and must at times shovel coal into the corners of the grate. If the stoker fails to work efficiently, he must resort to hand firing.

The fireman's work increases in direct ratio with the speed of the train, for the higher the speed, the greater the coal consumption. The maximum number of miles per hour in freight service is about 35, and in passenger service 70. A train being driven at the former speed, other things being equal, tends to consume half, or less than half, the coal required for the latter.

The conductor is the superior officer of the train, and with the engineer is held responsible for its operation. A passenger conductor testifying in arbitration proceedings on an eastern road gave the following description of his duties:

"The conductor reports 30 minutes ahead of time, or before his train is scheduled to leave, goes to the telegraph office, asks for orders, con-

sults the bulletin boards, registers, and reports as soon as he comes to the point where his train is located. He then goes ahead to see his engineer, compares watches with him, and then generally returns to the rear of his train to answer questions and direct people, until he receives a signal from the station master, which he gives to the engineer, and they go ahead.

"After the train gets under way he goes into the baggage car to see if any one is there who hasn't authority. He then takes up the transportation, and if anything in the smoking car requires attention, or if a passenger needs special attention on account of infirmity, he notifies a trainman. He also lines up with the trainman on heat, ventilation, etc."

A large part of the conductor's time is taken up with making reports. He must keep a record of tickets collected, itemizing each kind, as mileage, stop-overs, block or party tickets, duplex (cash fares), commutation, passes, etc. He usually keeps a record of cars handled, and makes reports on running time, defective cars, accidents, car and engine mileage, and violations of the Federal 16-hour law which prohibits more than 16 hours continuous service on the part of railroad employees.

The through freight train corresponds in a measure to the passenger express, and the way

The Mikado—A common type of freight locomotive entering Cleveland. The driving wheels are over five feet in diameter. The weight on driving wheels is over 122 tons. It has a water capacity of 7,500 gallons and a fuel capacity of 12 tons

freight, or drag freight, as it is sometimes called, to the local passenger train. There are in addition, work, wreck, circus, mine-run, switching, yard, pick-up and drop, transfer, and various other distinct kinds of freight service.

The work of the freight engine crew is similar to that of one in passenger service, while that of the train crew differs considerably. The freight conductor, like the passenger conductor, also reports to the office, looks over bulletins and special orders, but here the resemblance ends. On getting his train bills he goes to the freight yard, locates his train, and compares the bills with the cars to see that the numbers and initials correspond. He must also take a seal record of the car doors, with the rating of each car, contents, weight, and destination. Car seals are short pieces of wire leaded on one end which are put through the fastening of each car door so that the door cannot be opened without breaking the seal. The lead is pressed and initialed on one side and the number of the station where it is sealed is noted on the other. In this work the conductor is usually assisted by a brakeman. Although the cars have been examined and coupled by car inspectors, the conductor and brakemen are also supposed to look things over before starting. After the engine has been coupled the trainmen make the road test by applying all the brakes

and releasing them. The train is then ready for the road.

On the road the conductor frequently rides in the cupola of the caboose and from this point of vantage keeps a sharp lookout for trouble. He also supervises the work of his brakemen, one of whom is stationed at each end of the train.

While the train is in the yard the brakemen assist the conductor in checking and inspecting cars and equipment. Displaying train signals, and attending to the brakes are among their duties. On the main line the brakemen must help stop trains, control them on grades, and pick up and set off cars at their respective stations. Some roads require the brakemen to help the firemen. They must take care of the caboose signal lights and keep a careful watch of the train while it is in motion, and when it stops go back and protect the rear.

Union Organization

The railroad unions are among the strongest and most aggressive in the country. Beginning in 1863 with the Brotherhood of the Footboard, changed the following year to the Brotherhood of Locomotive Engineers, the unions have increased until now practically all railroad occupations are organized. In 1869 an organization

which developed into the Order of Railway Conductors was formed, and this was followed in 1873 by the Brotherhood of Railroad Trainmen. Other unions in due course were formed among the switchmen, trackmen, carmen, machinists, and telegraphers.

The membership of the unions for the entire country by occupations is given in Table 2.

TABLE 2.—UNION MEMBERSHIP IN RAILROAD OPERATING OCCUPATIONS

Occupation	Union membership	Per cent of total number in occupation
Engineers	73,000	90
Conductors	49,000	90
Firemen	91,000	75
Trainmen	134,000	65

Railroad employees often hold membership in more than one union. A qualified fireman must serve six months before becoming a member of the union but a fireman who becomes an engineer may still keep his membership in the firemen's organization.

The unions are all modeled upon the same general plan. They all oppose the sympathetic strike, keep strictly to their agreements, advocate the open shop, and are quite independent of each other. They have no affiliation with the American Federation of Labor, for the reason

that such affiliation might embroil them in sympathetic strikes. They all maintain some form of life insurance, as a distinct department, separately incorporated. This insurance feature is made obligatory in the stronger and older unions. Four organizations have underwritten for their membership over $500,000,000 of insurance. One of them, the order of Railway Conductors, paid claims in the year 1913 amounting to $1,135,000.

The influence of the railway unions has been especially effective in the field of legislation. Practically all the protective state and national legislation such as full crew laws, standardization of train equipment, car limit laws, employers' liability law, and others, have been secured through their efforts.

Differences between the unions and the railroad companies are usually adjusted by arbitration. Practically all of the larger strikes for almost a decade have been settled by arbitration boards. The Newlands Act of 1913 provides that whenever the employees and the railroad companies cannot reach an agreement the matter in dispute may be voluntarily arbitrated before a board consisting of representatives of the men, the companies, and the public. Many differences over wages, hours, seniority, overtime, doubleheading, and other details relating to

operating service have been settled in this way.

Accidents

The hazardous nature of railroad work is indicated by a statement made in the conductors' and trainmen's arbitration in 1913, by a prominent union official to the effect that the Trainmen's Brotherhood paid a claim for death or disability every seven hours and 15 minutes, and a man was injured in train or yard service, as reported to the Interstate Commerce Commission, about every nine minutes. At the same arbitration another witness for one of the railroad unions said that in 1912 a railway employee was killed every two hours and 24 minutes, and one killed or injured every three minutes and 36 seconds; and that a trainman (brakeman or flagman) was killed every five and one-half hours and one killed or injured every 12 minutes.

One factor which tends to increase the death rate and the number of accidents to an alarming degree is the employment of inexperienced men in busy seasons. In this connection, however, it is gratifying to note that with the invention of such safety devices as the automatic coupler, the air brake and block signal; with the spread of "safety first" propaganda and the increased use of steel cars the railroads are constantly reducing

the hazards of these occupations. That the casualties are still high is shown in Table 3 compiled from Interstate Commerce Commission figures.

TABLE 3.—SUMMARY OF CASUALTIES TO RAILROAD EMPLOYEES FOR THE YEARS 1912, 1913, AND 1914

Year	Employees on duty		Employees not on duty	
	Killed	Injured	Killed	Injured
1912	2,920	49,120	315	959
1913	2,939	56,619	362	1,178
1914	2,523	50,841	327	1,097

A peculiar ruling is followed in reporting accidents to the Interstate Commerce Commission. To be officially killed, a railway employee must die within 24 hours after the accident has occurred. Otherwise he is reported as injured, and an injury is never reported unless it prevents the employee from performing his duties for more than an aggregate of three days in 10 following the accident. By such a method of reporting, many injuries which do not incapacitate a man for duty, or result in death within a specified time, go unreported.

In the order of their importance as submitted in the conductors' and trainmen's arbitration the causes of railway accidents to employees have been:

Working about trains
Getting off or on cars
Falling from cars or engines
Coupling or uncoupling cars
Collisions
Derailments
Other accidents to trains, cars, or engines, including boiler defects
Overhead bridges, tunnels, or other fixed structures
Struck or run over by an engine or cars in station, yards, etc.

Age and Nativity

About one-third of the engineers and nearly one-third of the conductors are 45 years of age or over. Few men reach these positions before the age of 35. They enter the service as firemen and brakemen at a somewhat more advanced age than is usual in other industrial pursuits. Many of the railroads refuse to engage employees under 21 years of age.

Physical or sense defects which often accompany advancing age, and which would not disqualify a man in other occupations, do so in railroad work. At stated intervals all men who take part in train operation are required to meet certain tests of sight, hearing, color perception, etc., and if they fail are either dismissed from the service, or reduced to minor positions. This

tends to shorten their working life and if they fail to measure up to the demands of one railroad they will not be able to secure employment with another. It was found in a recent arbitration that the average length of service for an engineer is a little over 12 years.

Railroad occupations may be counted among the few in which the workers are still predominantly American. This is partly explained by the fact that railroad work demands familiarity with the language of the country. Over 85 per cent of all the engineers, conductors, firemen, and brakemen employed in Cleveland in 1910 were of native birth.

Wages

We need not here concern ourselves with the numerous controversies between railroad employees and officials over what constitutes a fair wage. Suffice it to say that the men are among the best paid workers in the country. The wage rate is determined either on the basis of hours or mileage.

The annual earnings of 25 engineers who testified before the arbitration board of the eastern district ranged from $1,200 to $2,386 a year, averaging $1,660. It was estimated that after allowing for "lay offs" and overtime a man who worked 300 days a year would earn about $1,400.

The higher sums are earned by the older engineers on picked runs. In an exceptional month a man may earn from $200 to $250. The minimum rates of pay on a mileage basis are for passenger service $4.25 for 100 miles or less, and for freight service $4.75.

The standard for computing wage rates for firemen is the weight of the locomotive on the driving wheels. A wage award which was handed down in 1913 divides the engines into nine classes ranging from less than 80,000 pounds to over 350,000 pounds and allows a special rate for the extremely heavy type known as the Mallet engine. The annual earnings of an average fireman are from $882 to $896.

The wage rates of firemen for a maximum 10-hour day are as follows:

Passenger service	$2.45 to $4.00
Freight service	$2.75 to $4.00
Switching service	$2.50 to $2.60
Two firemen	$2.75 to $3.00
Hostlers	$2.40 to $3.25

Data for conductors' earnings over a 12 months period are presented in Table 4. It will be noted that three-fifths of the conductors in the eastern territory earned between $1,200 and $1,600. The passenger conductors were the best paid men in the group, with more than one-fourth earning from $1,600 to $1,800.

TABLE 4.—ANNUAL EARNINGS OF CONDUCTORS IN EASTERN TERRITORY

	Passenger conductors	Freight conductors	Yard service conductors	General average
Per cent earning less than $1,200	5.4	27.7	41.0	25.6
Per cent earning from $1,200 to $1,600	45.6	66.3	57.1	58.7
Per cent earning from $1,600 to $1,800	28.2	5.3	1.2	10.1
Per cent earning over $1,800	20.8	.7	...	5.7
Average annual earnings	$1,597	$1,300	$1,112	$1,356

Besides the data of Table 4, the Interstate Commerce Commission has compiled figures on daily and yearly compensation of railroad employees which are presented in Table 5. In arriving at its figures on daily wages the Commission makes no distinction between regular wages and the amount paid for overtime. The figures for yearly earnings are computed by dividing the aggregate amount paid each class by the number of men in that class. They are based on returns from the large railroads of the country.

TABLE 5.—AVERAGE DAILY AND YEARLY COMPENSATION IN RAILROAD OCCUPATIONS IN EASTERN TERRITORY

Occupation	Daily earnings	Yearly earnings
Enginemen	$5.08	$1,597
Firemen	3.04	919
Conductors	4.19	1,344
Brakemen and other trainmen	3.06	945

The Sante Fe type of locomotive. The driving wheels of this type of locomotive are nearly six feet in diameter. It weighs on the driving wheels nearly 150 tons and has a water capacity of 9,000 gallons and a fuel capacity of 15 tons

Hours of Labor

The working day in freight service is 10 hours but this is often exceeded. Overtime for engineers is computed on the basis of 10 miles an hour, and paid for at the same rate on the minute basis. Overtime for firemen is computed either on a mileage or hourly basis, 10 hours or 100 miles being counted as a day's work. In computing overtime, the factor of miles or hours, whichever happens to be the larger, is made the basis of the computation. Overtime pay for firemen is calculated in the same way as for engineers. Trainmen are paid overtime for all service which exceeds 10 hours or 100 miles. In all departments of switching service 10 hours is considered a day's work and all excess time is paid for on a minute basis. The same rule holds for yard crews.

In local passenger service the engineer is paid at the rate of 50 cents an hour for all overtime, computed on a minute basis from the time he is required to report for duty until released. A separate computation is made for each part of a round trip. In through passenger service, overtime is computed on the basis of 20 miles an hour. The fireman receives 30 cents an hour, on the same basis. Any service in excess of five hours or 100 miles is considered overtime. Overtime for the train crew is paid as follows:

the conductors receive 45 cents an hour for all time in excess of their regular working day of seven hours and 45 minutes; assistant conductors, 35.7 cents; baggagemen, 27.5 cents; flagmen or rear brakemen, 26 cents; brakemen, 25.5 cents.

Overtime is the result of a number of shifting and diverse factors. At certain seasons of the year when traffic grows especially heavy, as in Cleveland after the close of lake navigation, engine and train crews are called upon to do a large amount of overtime work.

Another factor influencing overtime is density of traffic, which partly results from congestion of population. A dense population, such as is found in New England, not only requires a frequent passenger service but also is in need of a great amount of goods which to a large extent are carried as freight. Again, train operation between Cleveland and Pittsburgh, a territory in which traffic is relatively heavy, requires more overtime work of train and engine crews than is necessary in divisions of the southwest where the population is more scattered.

The facilities of operation also have an influence on overtime. A single track road, for example, is likely to get crowded and "crippled" through massing up of traffic or freight congestion. Employees on such roads are forced to

work more overtime, other things being equal, than employees on two and four track roads. Overloaded cars, and trains of too many cars are frequently the causes of overtime, since the crews cannot "get them over the road" in the usual 10-hour day.

The Problem of Training

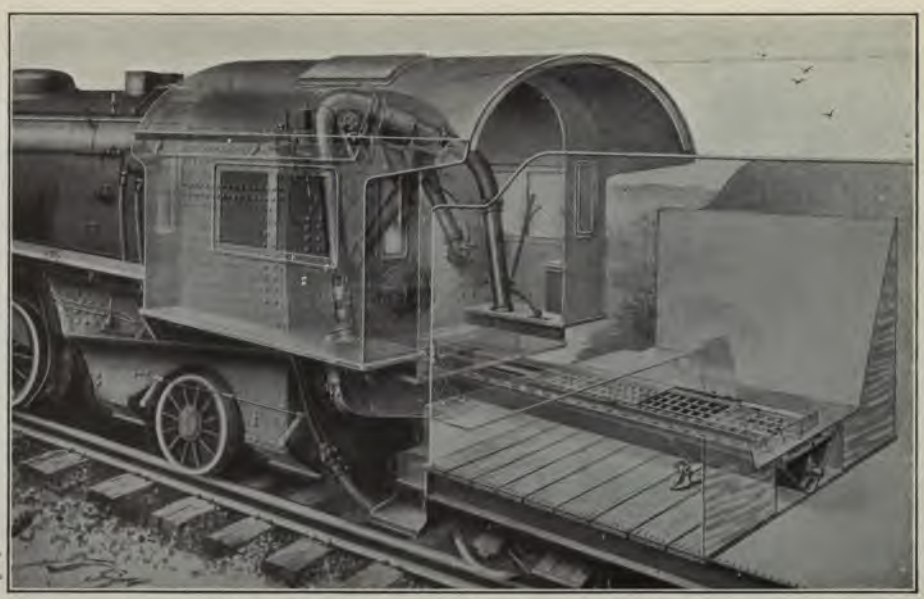
Among the occupations found in American industries there is none which demands broader insight, and greater ability to meet difficult situations with decisive action than those in railroad transportation. To secure trustworthy service is one of the problems which railroad officials must solve. Even with the best road and train equipment the operation of trains depends finally on the efficiency of the engine and train crews. The question of training is, therefore, of utmost importance. What educational preparation do men need for these occupations? How may they be fitted for advancement in their work?

The educational requirements are comparatively slight. A thorough grounding in the "three R's" is usually all that is necessary. Few of the workers in railroad service attended school beyond the eighth grade.

A large amount of trade knowledge which can

be gained in no other way comes through contact and participation after entering the occupation. The most important thing a fireman learns is how to keep up steam. He learns that careful planning is necessary in order to have his fire ready whenever needed. He learns how to husband his fuel so as to keep up the required steam pressure without waste. In the same way the brakeman learns to assist in making up a train, attend to the brakes, display signals, and so on. The positions of engineer and conductor demand a wider knowledge of the theory and practice of train operation. Before a man can rise to either of these positions, he must demonstrate his fitness for them. For this reason the roads require all employees to present themselves at frequent intervals for rigorous examinations.

One of the roads in Cleveland requires an examination of its firemen and trainmen six months after employment as to vision, color-sense, and hearing. They must also pass an oral examination on the characteristics of their division. In addition they are given a written examination on certain set questions furnished them in advance. Two years later they are examined again, the fireman for engineman, and the brakeman for conductor. Both firemen and brakemen are given oral examinations on operating automatic block signals, interlocking



Automatic stoker of street type. Coal passes through screen onto screw which carries it to endless chain of buckets running in pipe. These lift it to top of firebox, where it is blown over fire by steam. Increase in speed of engine increases speed of stoker

rules, and rules on air brakes. They take a more extended written examination than the first on questions for which they have had an opportunity to prepare. The scope of this examination is shown in the following outline:

QUESTIONS ON OPERATING RULES FOR THE WRITTEN EXAMINATION OF FIREMEN AND BRAKEMEN FOR THE POSITIONS OF ENGINEMEN AND CONDUCTORS

I. General rules
II. Definitions of nomenclature
III. Time, watches and clocks
IV. Time tables
V. Signal rules
    Visible signals
    Audible signals
    Communicating signals
    Train signals
VI. Superiority of trains
VII. Movement of trains
VIII. Rules for movement by train orders
IX. Forms of train orders
    1. Fixing meeting points for opposing trains
    2. Directing a train to pass or run ahead of another train
    3. Giving a train the right over an opposing train
    4. Giving regular trains the right over a given train
    5. Time orders
    6. Sections
    7. Extra trains
    8. Work extra
    9. Holding orders
    10. Annulling a regular train
    11. Annulling an order
    12. Annulling part of an order

13. Superseding an order or part of an order
14. Providing for a movement against the current of traffic
15. Providing for the use of a section of double track as single track

X. Manual block signals
- Positive block system
- Permission block system
- Home block system
- Indication of stops
- Indication of caution
- Indication of clear

XI. Automatic block signal, interlocking and telephone system

XII. Air brake examination
- a. Supplying of compressed air
- b. Blowing out brake and signal pipes—method of
- c. When to test brakes
- d. Minimum brake pressure
- e. Releasing brakes, how to
- f. Parts of automatic air brake applied to car
- g. Passage of air through brake pipe, explanation of
- h. Duties of triple valve
- i. Braking power, where carried
- j. Automatic brakes, applying and releasing
- k. Pressures
  - Excess, where carried
  - Maximum
  - Minimum
- l. Pressure retaining valves
  - Function
  - When used
- m. High-speed reducing valve, definition of
- n. Broken brake pipes, operation of
- o. Recoupling and brake tests
- p. Cutting out brakes
- q. Brake pipe leakage

r. Standing tests
s. Piston travel

Theoretically a fireman should be conversant with the use of the various kinds of brakes and brake equipment, such as the automatic air brake, the high speed brake, the regular air brake, and their component parts. He should know also how to locate and remedy any defects in governors, pumps, and valves; the general arrangement of the air signal system and how to remedy imperfections in it; the make-up and handling of trains; the various types of boilers and how they are constructed; the theory of firing and coal combustion; the theory of steam; the classification, care, and management of locomotives; and what to do in case of breakdowns. It is not to be understood that every fireman must have at his fingertips this complete store of knowledge, nor even that he must know all these things at examination, but it does mean that for a thorough and complete understanding not only of his present job but also of his next job such knowledge is necessary. The railroad tests may or may not include all these subjects, but the tests are made from them.

The brakeman needs a thorough knowledge of air brakes; their parts, their operation, and method of testing the various types. He must

know something of valves, levers, brake cylinder pressure, air signaling, car heating, and car lighting.

How Railroads Train Workers

All railroad employees must secure the greater part of their trade knowledge while on the job. Some years ago the secretary of the state board of education in a New England state wished to introduce a course of training for locomotive engineers in the trade schools. He claimed that he could train young men for locomotive engineering as well as for other mechanical occupations, but when he appealed to a minor official of the Firemen's Brotherhood to secure the coöperation of the railroads for his scheme, he was told that it was quite impractical because no matter how well the students were prepared they could not obtain positions as engineers without first serving an apprenticeship as firemen.

The policy followed by the railroads in the matter of training workers is founded upon sound business principles. Every train and engine crew is responsible for the lives of hundreds of passengers, or goods to the value of many thousands of dollars. To insure the safety of these goods and passengers the trains must

be adequately manned by crews who are thoroughly drilled in their duties and capable of performing them. For this reason the railroad has been forced to develop a highly efficient system of training for its employees.

Each of the five large railroads entering Cleveland has air-brake cars equipped with various forms of air brakes, air signals, pumps, valves, and injectors for the purpose of giving instruction to trainmen. The cars are moved from point to point over the railroad lines and the men usually notified of their arrival in advance. A competent instructor is put in charge of each car to explain the theory and practice of the apparatus, and also to give instruction in any new type of engine or train equipment. In addition to this instruction railroads usually have road foremen of engines, traveling superintendents, or other minor officials who ride the engines in order to inspect the work and instruct the men in more efficient methods of operation.

At least one railroad which enters Cleveland supplies its trainmen with a book of instructions in methods of operating the various forms of air brakes, air train signals, lighting, and heating systems. Enginemen and trainmen are examined from time to time by an air brake inspector and if qualified are given certificates of examination. The same railroad issues a

booklet of instructions on the theory and practice of firing in order to teach firemen how to prevent waste of fuel, and perform their other duties more efficiently. The following quotation from this booklet is presented to show that even in firing the use of scientific methods produces the best results:

"When a fireman becomes skilful at his work he follows the practice of scattering his coal

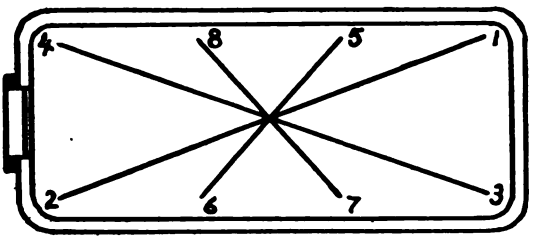


Diagram 1. Scientific method of firing. Shovelfuls of coal are thrown into the fire-box in the locations and in the order indicated by the numerals

over the parts where the bed is thinnest. With an engine that burns the fuel evenly the practice illustrated in the accompanying diagram is a good one. As will be observed, the fire box is of the long, narrow type, on which it is difficult to maintain an even fire, but with slight changes this system of firing can be employed with any form of fire box. The scoopfuls of coal are

thrown successively to the points indicated by the numbers. That system will tend to make the bed of the fire uniform, but of course the judgment of the fireman must be depended upon to cover any thin spot that may appear."

That correct firing represents a direct money value to the railroad is shown by the experience of an engineer with two firemen. As the engineer describes it, the first man commenced work "as if his father owned the mine that supplied the coal," and in one hour and 55 minutes, with the wind behind, shoveled over 8,000 pounds of coal from the tender into the fire box. The following day the engineer made the same run with the same engine and train, with about the same weather conditions, but with a different fireman. He made the terminal on time with a total consumption of approximately 4,500 pounds. This represented a saving in coal of 3,500 pounds, or, at the rate of $3.00 a ton, an economy of $5.25.

Other educational aids are free reading rooms and traveling libraries provided by the railroads. Correspondence schools also play an important rôle in the training of railroad employees. They offer courses for many lines of railroad work. In these courses use is made of instruction papers, examination questions, and air brake charts. One school also maintains a number of

air brake equipment and locomotive appliances. These schools have students in all parts of the country.

The Contribution of the Public School

In view of the effective training given by the railroads themselves, there seems to be little that the public schools can do in the way of providing direct preparatory training for boys who plan to enter railroad work. There are several reasons for this. The training required is of such a nature that most of it must be secured through actual participation in the active work. Moreover the educational training offered by the railroads themselves is far more complete, adequate, and practical than is the case in most other industries. In addition there is a serious gap between the time when the boy leaves school and the time when he may enter railroad work. In general boys leave school at the age of 15 or 16 and do not enter railroad work until 21 or 22. During the intervening half dozen years most of them are engaged in a great range of occupations quite unrelated to railroading.

There are three respects in which the public schools might perform a valuable service in giving a more useful preparatory training to boys who are going into railroad work. In the first

place a general course in elementary science would impart to them by laboratory methods and demonstration the fundamental idea of the nature of combustion, the expansion of steam, air pressure, and other similar phenomena illustrating scientific principles.

In the second place the progress of railroad men in their work is largely dependent on their ability to pass examinations covering the knowledge required for each higher step in the scheme of regular promotions maintained in the service. Here a thorough mastery of reading and writing is the essential. It is not enough that the school has imparted to the boy the ability to read and write. What is needed is that he may have acquired in his school days such a mastery over these instruments of getting and recording knowledge that 10 years later he may be able to use his reading naturally and easily in mastering technical material of increasing difficulty and his writing in recording the fruits of his reading as well as the knowledge gained through his practical experience.

In the third place a similar statement may be made with regard to the school's contribution in the matter of arithmetic. Except for reading, this is the most important school subject from the point of view of the railroad man. At the present time the arithmetic given by the schools

is probably ample in extent and amount. What is lacking is the vital relation between the knowledge and its application which should enable the boy or the man to make effective use of what he has been taught. At the present time the railroad examinations frequently show that the men are far from proficient in performing even the simpler problems in arithmetic that have to do with railroad work. This is not because they have not learned in school all of the operations necessary for solving the problems. In most cases they have learned all of the arithmetic that would be necessary and far more. The trouble is that the schools have not adequately taught them that arithmetic is an instrument to be used in an endless number of relations and combinations in solving everyday problems. It has been to them something that was concerned with symbols set down on paper by means of a pencil rather than something concerning such practical matters as pounds of coal, gallons of water, numbers of freight cars, or totals of cash fares.

In making these observations concerning what the school may do for the boy who is going into railroading, nothing has been said that does not apply with equal effectiveness to the boy going into almost any other sort of life work. Nevertheless the fact remains that the

most valuable contribution that the school could possibly give to the boy who will become a railroad man would be the ability to make practical use of the knowledge he possesses. In this specific case the most immediately valuable form of this ability would be in giving the boy a more practical training in general science and mechanics, an increased ability to use reading as an instrument for acquiring knowledge, and a greater facility in using arithmetic for the solving of practical problems as they present themselves in the course of the day's work.

The problem of offering industrial training to railroad men after they have entered upon their occupations is one that calls for serious consideration by the public school authorities. There are between 4,000 and 5,000 of these men living in the city and their number is constantly increasing. They are a carefully selected force of workers and their chances of promotion in their work are dependent on their ability to succeed in a succession of definite and exacting examinations.

While it is true that they gain most of their industrial skill and knowledge through contact and participation in the work itself, it is also true that there remains to be supplied a certain amount of definite school training which can-

not easily be secured in the work itself. That this is true is demonstrated by the fact that these employees each year invest large amounts of time and work and considerable sums of money in educational courses secured from the correspondence schools.

In several important respects correspondence courses more nearly fit the needs of these men than such regular courses as might be given in the evening in the technical high schools of the city. Most important of these reasons is that the hours of labor in railroad work are so variable that the men would experience great difficulty in attending a regular course and the schools would have to arrange their courses on an exceptionally flexible basis to meet the need. Nevertheless the scope and nature of the need may be accurately gauged by studying the work now being done in these correspondence courses and the technical schools of the city should study the field in order to discover what portions of this work they might profitably take up.

PART II

MOTOR AND WAGON TRANSPORTATION

The cartage of goods by motor or horse-drawn vehicles over our country roads and city streets is the most expensive form of freight transportation. According to the Secretary of Commerce of the United States, the people of this country spend each year approximately $300,000,000 on ocean freights, $2,000,000,000 on rail transportation, and several times the total of these two sums for cartage. No one knows the size of Cleveland's annual bill for the haulage of merchandise, but it is probable that this expenditure is greater than the entire cost of supporting all the activities of the city government. It is estimated that the cartage of goods in Cleveland engages the services of upwards of 10,000 men, 20,000 horses, and 5,000 motor vehicles, at an annual expense of between $20,000,000 and $30,000,000.

Chauffeurs and Repairmen

No accurate data are available on which to base an estimate of the number of men in this city

employed as chauffeurs. There were some 27,000 gasoline or electrically propelled automobiles operated in Cleveland and in its environs in 1915, and it is predicted that before the end of 1916 the number will be increased to 30,000. From these figures an early fulfillment of the prediction that the twentieth century is to be a "horseless age" seems certain.

Motor-driven vehicles have long passed the experimental stage and are being used in practically every branch of industry. The gasoline truck has a wide use in all kinds of local haulage. In suburban service it has little competition from either horse-drawn or electric vehicles, because of its greater speed and carrying capacity and the fact that its fuel can be replenished almost anywhere. The electric vehicle is for the most part confined to city use, because the recharging of the batteries must be done at service stations or garages after comparatively short mileage has been made. It has the advantage of being clean and easy to operate. It is used extensively in the delivery of merchandise, although in some forms of retail business in which many stops must be made in covering a route, such as in delivering ice, milk, etc., the use of horses and wagons is still considered the most economical practice.

In most establishments where motor trucks

Packages for retail delivery are first sorted into large bins or compartments constructed along the sides of the shipping room and are then re-sorted according to streets and numbers

have supplanted horse-drawn vehicles the drivers have become chauffeurs. The driver understands the delivery part of the work, and with a little training by a competent instructor soon becomes proficient in operating the truck. In some cases a representative of the automobile company trains a driver on the job. He in turn instructs a helper who will sooner or later become a chauffeur.

Some large companies, when they change from horse-drawn wagons to motor trucks, send their drivers to the automobile factory, where they are instructed by an expert in the construction, operation, and care of the truck. The men are then taught to handle the trucks in crowded traffic. In addition, printed instructions for keeping the machine in good running order are furnished all drivers.

Where only one or two motor vehicles are used the drivers make minor repairs and simple adjustments, but in businesses requiring a large "fleet" of cars or trucks this work is usually done by repairmen. Private families owning a number of cars often employ, as chauffeur, an automobile mechanic who makes most of the repairs and thoroughly overhauls the cars at least once a year. It is not uncommon for purchasers of automobiles manufactured in Cleveland to secure their chauffeurs from the local companies.

There are approximately 200 automobile repair shops in the city. Repairmen in the smaller shops must have an all-round knowledge of automobile construction and machine shop work. In some of the larger service stations the work is specialized, a few men making all repairs connected with the lighting and starting systems, others doing lathe work, still others doing rear axle work. Inspection forms another branch of this service. New motor trucks, for example, are inspected by a mechanician sent by the company once a month during the first year after the sale.

Many men now doing repair work in garages and service stations were formerly employed in local automobile factories as machinists. Few chauffeurs become repairmen, or repairmen chauffeurs. Some boys learn repair work as helpers in garages. No regular method of training is followed. They begin at the simpler tasks, such as oiling, filling grease cups, changing tires, repairing springs, etc. Later they take up such work as adjusting and tightening brake bands and steering gear, grinding valves, or hunting for spark trouble, and finally advance to the more difficult repair jobs on transmission, ignition, and self-starters.

Wages are paid on a monthly, weekly, daily, or hourly basis, according to the practice fol-

lowed by the establishment. In some of the large express, transfer, and taxicab companies chauffeurs earn from $50 to $75 a month. The wages of private chauffeurs range from $40 to $100 a month, with an average of approximately $75. Weekly wage rates for chauffeurs range from $12 to $20, and day rates from $2.25 to $3.00. Gasoline truck chauffeurs earn somewhat more than electric truck chauffeurs and teamsters. The wage rates of repairmen vary from 30 to 40 cents an hour, the best workmen receiving as high as 45 cents an hour. In some kinds of retail business the drivers are allowed a commission which considerably increases their wages. Some establishments occasionally offer a money prize to the driver securing the greatest amount of new business within a certain period.

Chauffeurs usually work from 10 to 12 hours a day, although where union regulations prevail the working day is limited to 10 hours, and the working week to 60 hours. Repairmen work from nine to 10 hours a day. In retail delivery and in some lines of express service the hours are somewhat irregular. To some degree this is inevitable, due to the nature of the business, but the unions have bettered conditions in this respect by requiring pay for overtime. In establishments which use a large number of

motor vehicles repairmen or garage foremen see that the trucks are oiled, adjusted, and kept in good repair, and even when drivers are required to take care of their trucks the work takes only a short time. Both chauffeurs and repairmen have fairly steady employment throughout the year.

Many of the chauffeurs are affiliated with the International Brotherhood of Teamsters, Chauffeurs, Stablemen, and Helpers. There is also a local organization, or club, known as the Ohio Automobile Operators Association, which has a membership of 750, most of whom are taxicab drivers and private chauffeurs.

At present three private schools in Cleveland offer courses of from six to eight weeks in length in automobile construction and operation. They carry on day and night classes and charge a tuition fee of from $30 to $60. The total enrollment in the three schools is between 100 and 150 students. In one of these schools a large part of the instruction consists of lectures on special subjects by men in the trade and repair work under the guidance of foremen; and in the others the courses include practice in taking down and assembling various types of machines under the guidance of instructors.

In the opinion of the Survey Staff an elective course in automobile construction and operation

A light electric truck loaded with package goods for Cleveland purchasers

should be introduced in the technical high schools. The purpose should be to give the boy a clear understanding of the mechanical principles involved in automobile work. The shop-work should consist of dismantling and assembling various types of automobiles, together with instruction as to the operation and use of every part. Actual practice in repair work should be included in the course. The administrative details can be easily arranged, the principal difficulty at the present time being the lack of space in the high school plants. The technical night schools might well organize similar classes for those who are unable to attend a day course.

The benefits of a course of this kind are not limited to future chauffeurs and repairmen. The ability to drive an automobile will soon be considered essential for every man. The knowledge acquired through such instruction would prove of real value to a large majority of the boys now in school.

Teamsters

At least 4,000 men in the city are employed as teamsters. Notwithstanding the increase in the use of motor vehicles during the past decade, the horse-drawn wagon is still an important

factor in city transportation. This condition will maintain for some years to come, although the horse will ultimately almost disappear from our city streets.

The general conditions of employment are similar to those conditioning the work of chauffeurs. The teamster earns about the same as the chauffeur, belongs to the same union, and works approximately the same hours. Those employed in the smaller establishments, where they must stable and feed their teams, usually put in a longer working day than is required by firms owning a number of wagons or trucks, where the stable work is done by hostlers.

Although usually considered an unskilled occupation, teaming, in a modern city, calls for a general familiarity with local geography, traffic regulations, and so on, not possessed by the average common laborer. Before a man can get a job he must show that he knows how to handle horses. Some knowledge of English is essential, and due to this fact only a small proportion of the teamsters in the city are of foreign birth.

The influence of trade union organization has had a marked effect on both wages and hours of labor in recent years. Local branches of the International Brotherhood of Teamsters, Chauffeurs, Stablemen, and Helpers have been es-

tablished in Cleveland among the truck drivers, van drivers and furniture handlers, taxi chauffeurs, beer-wagon drivers, ice-wagon drivers and helpers, pop and selzer drivers, sanitary drivers (garbage collectors), and laundry drivers. The number enrolled in these branches has not been made public. Table 6 shows the union scale per hour for teaming and delivery work in various industries.

TABLE 6.—UNION SCALE PER HOUR FOR TEAMSTERS, CLEVELAND, 1916

Occupation	Cents per hour
Teamsters	
Teamsters' helpers	25.00
Horse-drawn vehicles	26.67
Sanitary drivers' helpers	28.13
Sanitary drivers	31.25
Soft drink drivers	33.33
Brewery drivers	
Drivers, bottled beer, routes	28.07
Drivers, extra keg beer	31.48
Drivers, bottled beer	35.42
Drivers, keg beer routes	37.04
Truck drivers	
Light single	19.17
Heavy single	20.83
Light double	22.50
Two horse	25.83
Three horse	29.17

The skill and knowledge necessary for the least exacting positions in the field of motor and wagon transportation are strikingly separated from the degrees and kinds of skill and knowledge essential for the most exacting positions

in the same field. The great majority of teamsters are but little superior to common laborers in the degree of skill, intelligence, or education required for their work or in the wages they receive for it. Even in the driving of motor vehicles, no large amount of ability is necessary unless something besides mere driving be required. Only brief periods of training are necessary to teach most people how to drive a motor vehicle, and it is the experience of the automobile schools that even those pupils who cannot learn to repair or adjust the mechanism can easily be taught to drive the machine.

At the opposite extreme of this occupation are a few scattered individuals who may rightly be regarded as its aristocrats. They are of three sorts and possess an amount of ability far beyond that of most of their fellow-workers. In the first place there is the skilled chauffeur employed by a private family of large means and having charge of a number of cars. He must not only be a skilled driver, competent to pilot a powerful touring car over almost any kind of road, but he must be a skilful mechanic, able to keep his machines in perfect condition and to make roadside repairs on any of several makes of automobiles. In addition to all this he must talk correctly, dress well, and have some mastery of polite social usage.

Another of the aristocrats of street transporta-

tion is the driver employed by the fire department to pilot the great ladder truck or heavy engine through the crowded streets as fast as the galloping horses or powerful motor can take it. This requires a skill of hand and eye, a strength of arm, and a steadiness of nerve that few men possess.

The third type of exceptional man in this work is the one engaged in extra heavy teaming. As each modern building is erected in the city, enormously heavy loads of steel beams, large pieces of machinery, and great boilers must be transported through the streets to the location where the building operation is going on. Most of this work is done at night. Some of the trucks used in Cleveland are built to carry a load as great as 60 tons and they are drawn by some 12 to 20 span of horses. The driver of even a much smaller team than one of these must be a most exceptional man.

Despite the fact that street transportation by wagons and by motors employs the services of a few experts of the types mentioned, the basic condition is that the great bulk of its workers can profit but little by any special vocational training that the schools can give. They all need the ability to read and write English and many of them use simple arithmetic. Beyond this most of the proficiency in their work must be gained through actual contact and experience.

PART III

STREET RAILROAD TRANSPORTATION

Among the activities which are inextricably woven into the fabric of city life there is none which comes into closer touch with the average citizen than street car transportation. While little more than half a century old, it has had in the same period of time a more rapid expansion than most other industries. Its growth and development since 1900 has been especially noteworthy. From 1902 to 1912 the number of persons employed by the street railroad companies of the United States increased from 140,000 to 282,000, or more than 100 per cent.

In the city of Cleveland at the close of the year 1915 there were employed in this service approximately 2,500 conductors and motormen practically evenly divided in number. Owing to the use of "trailers" it might naturally be supposed that conductors would form the larger group. That they do not is explained by the fact that during certain hours of the day motormen serve as conductors on trailer cars. During this year 2,500 men operated 1,445 cars over

360 miles of track, and collected over 242,000,000 fares. Their wages for the same period amounted to a total of $2,100,000, forming the heaviest item of expense to the street car system. The car mile expense in 1915 was 12.6 cents, of which 6.6 cents, or more than one-half, was spent for wages.

Qualifications for Employment

When a candidate presents himself for employment on the Cleveland Street Railway he is interrogated by the employment agent, and if considered at all available is given an application blank to fill out. On the blank he notes his name, address, birthplace, conjugal condition, whether he uses liquors and cigarettes, whether he wears eye-glasses, his trade or occupation, place and nature of last employment, and previous service, if any, in street or electric railway work. The age, height, weight, color of hair and eyes, and physical condition of the applicant are also recorded, as well as the names and addresses of former employers and others for reference. A photograph of each applicant is attached to his application blank. The applicant pledges himself to discharge his duties faithfully and honestly, obey all rules, abstain from liquor, and pay for all damages caused by his carelessness.

If successful in securing employment, he is given a preliminary training of at least 10 days' duration, without pay, during which time, under competent and experienced motormen or conductors, he is taught by actual car operation how to operate the controller, how to apply and release the brakes, and the other duties connected with the careful running of a car through crowded streets. The conductor is taught the names of the streets, how and when to call them, where stops are to be made, when to turn lights on and off, how to act in case of accidents, and the various duties which deal with the sale, collection, and reporting of transfers and tickets. At the end of each day the conductor or motorman who has served as instructor reports on a blank form the progress made by the applicant, on the last day certifying whether or not the man is qualified to operate a car safely. The new man, after satisfying the division superintendent as to his fitness, is placed on the extra list until the service permits his securing a regular run. In Cleveland the majority of the applicants for these positions are natives of the city.

Former Occupations

Applicants for employment in street railway service in this city are drawn from all walks of

The one-horse "Bob Tail" car of 40 years ago. The earliest type of horse car used in Cleveland

TABLE 7.—PREVIOUS OCCUPATIONS OF 589 APPLICANTS FOR THE POSITIONS OF MOTORMEN AND CONDUCTORS, CLEVELAND STREET RAILWAY, 1915

Occupation	Number
Farmers and ranchmen	89
Laborers	70
Previous electric railway experience	59
Machinists and polishers	56
Teamsters and deliverymen	42
Soldiers and sailors	34
Office and shipping clerks	33
Steam railroad experience	31
Mercantile clerks	31
Salesmen, collectors, and solicitors	20
Repairmen and truckmen	12
Iron, steel, and tin workers	11
Carpenters and woodworkers	11
Painters and wall paperers	10
Steam and electric railway experience	7
Tailors and pressers	7
Students and teachers	6
Butchers and meat cutters	5
Coal and ore miners	4
Electricians and linemen	4
Hospital attendant	3
Molders	3
Stationary engineers and firemen	3
Upholsterers and chair workers	3
Plumbers and steamfitters	3
Printers	3
Seamen	2
Horseshoers and blacksmiths	2
Telegraphers	2
Pattern makers	2
Cooks and waiters	2
Barbers	2
Lumberman	1
Lamp glass worker	1
Foreman	1
Milkman	1
Window trimmer	1
Pottery worker	1
Jeweler	1
Ticket agent	1
Coremaker in foundry	1
Tanner	1
Cooper	1
Baker	1
Horseman	1
Engraver	1
Mail carrier	1
Stone-cutter	1
Photographer	1
Total	589

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The common belief that street car work is a temporary job is not borne out by the figures of the Cleveland Railway Company, which show that 53 per cent of the men have served four years and over. Less than 20 per cent were first-year men.

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In Cleveland no one is admitted into the service before the age of 21 or after 35. Occasionally exceptions are made for applicants, who, although over the entrance age, prove themselves exceptionally fit. No maximum age for retirement is set. As a rule applicants for these positions are in their early twenties. Of 110 applicants for positions with the Cleveland street railway in 1915, three-fifths were 25 years of age or under, and more than four-fifths were 30 years or under.

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of traffic requirements, and certain runs are looked upon as prizes because they offer a longer working day, and when once secured are considered in the same light as a promotion would be in any other industry.

Chances of promotion to higher positions in street railroad service are few. This is indicated by the fact that in the Cleveland system there are at present 2,500 motormen and conductors to one general superintendent; 416 to each division superintendent; 89 to every dispatcher, and 71 to each inspector.

Discipline

The division superintendent in administering discipline is supposed to take into consideration the nature of the offense, the length of service of the employee, and his previous record. For minor offenses, such as carelessness as to personal appearance, failure to report promptly for duty, to turn the sign on arrival at destination, or to snap off lights at the proper time, the employee may be reprimanded. Such offenses as gross incivility, preventable accidents, or indulgence in liquor while on duty bring summary discipline. Serious offenses result in a temporary lay-off pending investigation. The employee may appeal

The latest type of Cleveland street car. Passengers enter at the front of the car and leave by the side

through the officers of his union to the general superintendent, the general manager, and even to the president of the company, and finally the case may be submitted to an arbitration board.

Cash Deposits

In Cleveland street car conductors are required to make a cash deposit of $20 to cover the cost of tickets, transfers, and change which they carry. This deposit is returned when they leave the service.

Union Organization

Two forms of union organization are found among wage-earners: the industrial union, in which all the workers in the industry hold membership; and the trade union, in which only men of a single occupation are eligible to membership. Up to 11 years ago, union organization among street railway employees in Cleveland was of the former type. As a result of a strike at that time the organization was broken up, and a union including only motormen and conductors was established.

Over 90 per cent of the motormen and conductors employed by the Cleveland Railway Company are members of the local association,

which is a branch of the Amalgamated Association of Street and Electric Employees of America. An agreement between the street car company and the union sets forth the conditions under which work shall be performed. It covers such subjects as wages, hours, discipline, free transportation to employees, seniority, eligibility of union officials for service, posting of schedules, lay-overs, drinking, pay for time when called for duty and not used, regulations for uniforms, continuance of wages when looking up evidence or giving testimony, loyalty to the company, etc.

This agreement also provides for the settlement of strikes by a board of arbitration to be composed of three men, one chosen by each of the interested parties who in turn select the third. Each party must name its arbitrator within 15 days or forfeit its case, and the two arbitrators must then select the third within 10 days. If unable so to do, the representatives of the company and of the association meet with the arbitrators already chosen and endeavor to agree on a third. As a last resort this third arbitrator is appointed by the judge of the United States Court in the Cleveland district. It is stipulated that the findings of the majority of the Board are binding on both parties to the arbitration.

Among 106 cities where motormen and conductors are organized, with the single exception of Chicago, the union rate in Cleveland is as high as any, in spite of the fact that Cleveland is the only city with a three cent fare. Union rates per hour in six large cities are presented in Table 8. It will be noted that in only one of them do the rates attain the maximum reached in Cleveland and in none, with the exception of Detroit, is it gained in so short a period of service.

TABLE 8.—UNION WAGE RATES OF MOTORMEN AND CONDUCTORS IN SIX LARGE CITIES, SEPTEMBER, 1915. CENTS PER HOUR IN EACH YEAR OF SERVICE

City	Years of service									
	1	2	3	4	5	6	7	8	9	10
Boston	26½–27	28½	29	29½	30½	32	..	..	..	..
Cleveland	**29**	**32**	..	..	..	..	..	..	..	..
Detroit	25–30	32	..	..	..	..	..	..	..	..
Buffalo[a]	23	24	25	27	28	29	29	29	29	30
Buffalo[a]	23	25	26½	28	29	30	..	..	..	..
Cincinnati	21–22	24	24	25	25	25	26	26	27	28
Indianapolis	21	23	24	25	26	27	..	..	..	..

[a] Two divisions of the street railway union.

Another comparison which throws some light on the relative standing of street car occupations as to wages is shown in Table 9 which lists six occupations in which the union rates are approximately the same as those paid conductors and motormen.

TABLE 9.—HOURLY UNION RATES PAID CONDUCTORS AND MOTORMEN COMPARED WITH THOSE IN FIVE OTHER OCCUPATIONS

Occupation	Rate per hour
Press feeders, lithographic presses	.2917
Auto van driver	.3000
Warehouse men	.3000
Machinists, specialists	.3056
Building laborers	.3125
Street Railway Conductors and Motormen	**.2900–.3200**

Dividing the amount expended for wages in 1914, by the number of motormen and conductors employed gives an average yearly wage of about $800.00. Data submitted by the union in the 1914 arbitration indicate that about 35 per cent of the men earn $3.20 or over per day during their second year of service, 40 per cent from $2.88 to $3.20, 15 per cent from $2.24 to $2.88, and the remainder less than $2.24. These figures do not include Sunday work.

Hours of Labor

Figures compiled by the union and giving the working time of 851 men employed as motormen and conductors in Cleveland are presented in Table 10.

If the traffic were uniform throughout the day, the total time on duty, which is greatly in excess of the actual time paid for, would be considerably reduced. Diagram 2 indicates the hours

The Cleveland Trailer—A familiar type of car on most Cleveland street car lines

of the day when traffic is at its heaviest on a typical Cleveland run.

TABLE 10.—PER CENT OF MEN WORKING SPECIFIED NUMBER OF HOURS PER DAY

Hours	Per cent
10 or over	35
9 to 10	40
8 to 9	13
7 to 8	2
Less than 7	10

On the Superior Avenue line the cars leaving the Public Square range from two to 30 an hour. The diagram shows that two "peak loads," or heavy traffic periods, occur each day; one in the morning from seven to eight o'clock, and a still heavier one in the evening from five to six o'clock, when traffic reaches its maximum. The morning peak, however, shades off gradually, dropping from 27 cars per hour between seven and eight o'clock to 23 cars between eight and nine, with 12 cars per hour from then on until three o'clock. The evening peak reaches 30 cars per hour between five and six o'clock, but falls sharply to 16 cars between six and seven o'clock and continues to decline slowly until one a. m.

A service which is called upon to meet such varying demands necessarily involves irregular working hours. The Ohio state law provides a

maximum of 15 consecutive hours of labor for a conductor or motorman, with at least eight hours rest before being called again for duty, except in

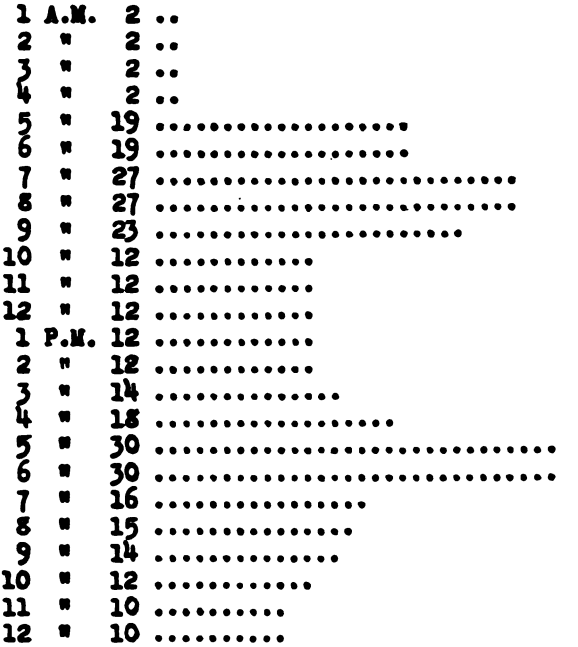

Diagram 2.—Average number of street cars each hour of the 24 on the Superior Avenue line

the case of an unavoidable accident. The law sets only the maximum hours, but the local union in its agreement with the Cleveland Railway Company has secured the following rule:

"For motormen and conductors, all runs shall conform as nearly to a 10 hour work day as possible, and no run shall exist that cannot be completed inside of 12 consecutive hours, with a leeway of half of a trip to complete schedules, in any calendar day of 24 hours, with the exception of swing runs which shall be completed in the shortest number of hours possible." On swing runs, that is runs in which the working hours are at regular intervals but not continuous, and on tripper runs, or runs given out by the trip and not on a regular schedule, the hours are not only long and irregular, but the actual time worked is sometimes short.

Except for imparting general mechanical knowledge and training in the habit of courtesy there seems to be but little that the public school can contribute toward the direct vocational education of the street car employee either before or after he enters the service. As in many other forms of industrial work, the contribution of the school must be indirect rather than direct. This does not mean that it is unimportant. On the contrary, it is of the utmost importance. Public expenditures for public education pay only one sort of dividend. This dividend takes social form in the shape of minds trained to think straighter, more sequentially, more logically, more incisively. In measure as